Quincy COMPRESSOR

The Science of Compressed Air

Refrigerated Air Dryers

CYCLING REFRIGERATED AIR DRYERS

OPERATOR'S MANUAL

QPCD 100a

DATE OF PURCHASE:
MODEL:
SERIAL NO.:
Record above information from nameplate. Retain this information for future reference.

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GENERAL INFORMATION

The Quincy Cycling Refrigerated Drying System is designed to cool and remove moisture from compressed air.

When properly installed, the unit requires little maintenance or adjustment.

⚠ WARNING

DO NOT install, operate, maintain, adjust or service this unit without thoroughly reading this manual.

This manual contains important safety information. Read THOROUGHLY and follow the Safety Instructions provided in this manual and posted on the unit. Keep this manual near the unit and in a safe place. Replace this manual if it becomes torn or dirty and cannot be properly used.

Please read the Installation Instructions and Start-Up and Operation sections of this manual before attempting to operate the unit.

Please read the Maintenance and Troubleshooting sections of this manual before beginning any maintenance or service work on this unit.

INSPECTION

Inspect equipment. Any concealed shipping damage must be reported to the carrier immediately. Damage claims should be filed by the consignee with the carrier.

SAFETY INSTRUCTIONS

When using air compressors, dryers and compressed air accessories, basic safety rules and precautions must always be followed, including the following:

1. **READ ALL INSTRUCTIONS FULLY.**
2. **WIRING & BREAKERS**
   Wiring, breakers and other electrical equipment must conform to local and national electrical codes.
3. **USE SUITABLE PARTS & ACCESSORIES**
   Do not use air pressurized accessories or parts in the air system not matching the maximum air pressure. Make sure the maximum pressure specified by the accessory manufacturer is matching or well above the working pressure of your compressor.
4. **RELEASE AIR PRESSURE SLOWLY**
   Fast moving air will stir up dust and debris, which may be harmful. Release air pressure slowly when depressurizing your system to avoid bodily injury.
5. **SECURE DRAIN LINES**
   Fasten drain lines to floor or drain. Pressurized air will periodically pass through drain lines, which will cause an unsecured line to whip and may cause bodily injury.

⚠ WARNING

Air from compressor and from Quincy Air Drying System, as equipped, is *not* safe for human respiration (breathing).

To provide safe, breathable air, compressor must be capable of producing at least Grade D breathing air as described in Compressed Gas Association Commodity Specification G7.1-1966. Special filtering, purifying and associated alarm equipment must be used to convert compressed air to "Breathing Air." Other special precautions must also be taken.

Refer to OSHA 29 CFR 1910.134.

DISCLAIMER OF WARRANTY

If this unit is used to produce breathing air, the special equipment and precautions expressed in OSHA 29 CFR 1910.134 for specifications of the necessary equipment and special precautions to make Breathing Air MUST BE used or any warranties are VOID and manufacturer disclaims any liability whatsoever for loss, personal injury or damage.

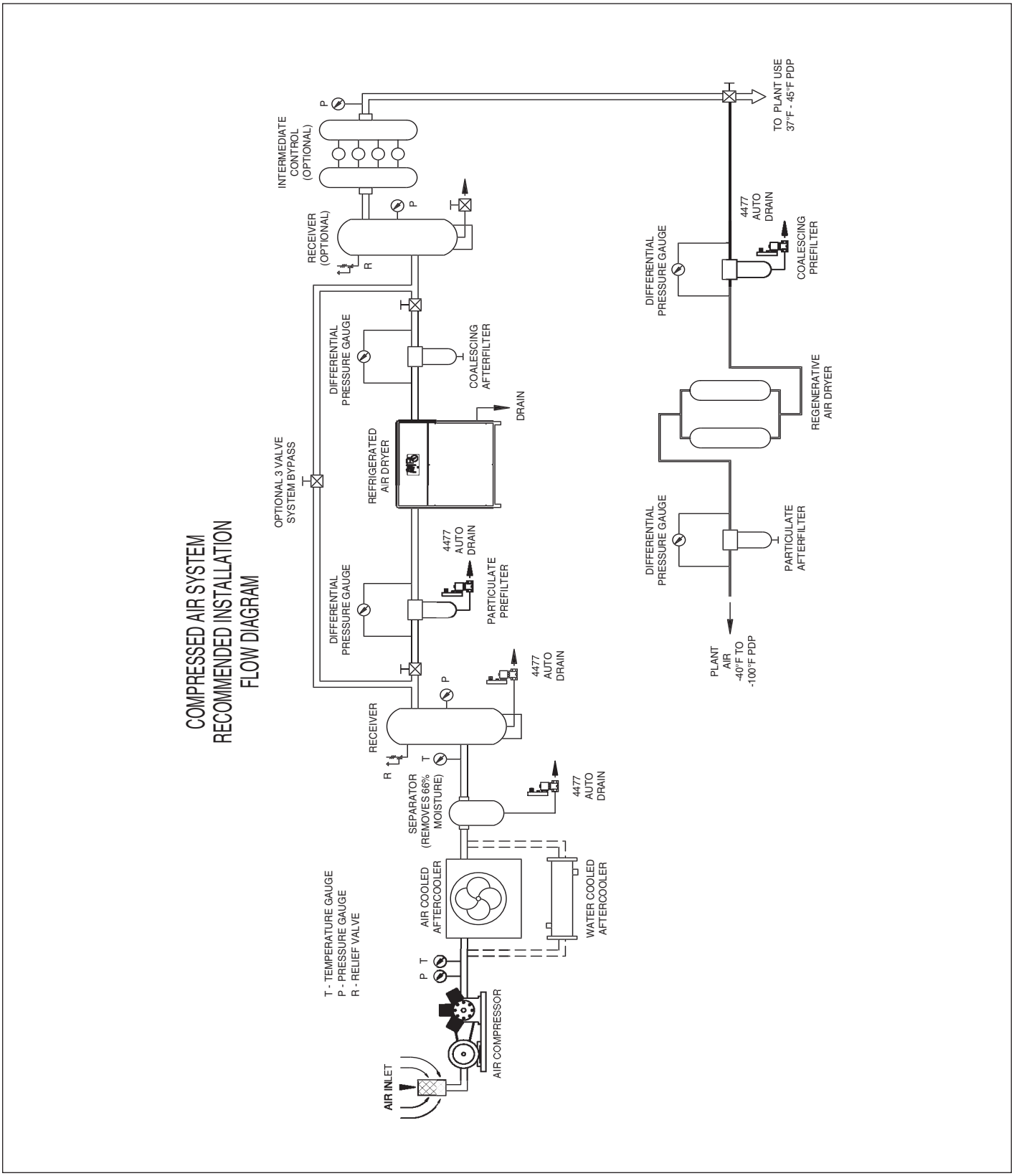


FIGURE 1 — COMPRESSED AIR SYSTEMS RECOMMENDED INSTALLATION FLOW DIAGRAM

1. Install the dryer indoors in an area where the ambient temperature will be above 40°F and below 110°F. Temperatures below 40°F and above 110°F may cause erratic operation and premature failure of the air dryer. Refrigerated dryers must be installed indoors.

   Air-cooled dryers must be installed in a location with proper ventilation which will maintain ambient temperatures as specified above.

2. Position the dryer to permit free circulation of cooling air through the condenser. Keep two feet minimum clearance space around the dryer, and also on the top for servicing.

   Lack of ventilation can build up the room temperature by recirculating the same cooling air through the condenser over and over again. This will eventually shut down the refrigerant compressor on high head pressure, or on the internal overload.

3. Connect the compressed air from the receiver to the dryer inlet. Connect the plant compressed air line to the dryer outlet. A three-way bypass around the dryer is recommended for dryer service. It is a good practice to install a Particulate pre-filter and a coalescing after-filter to the air dryer.

   Make sure when piping is in place that no undue stress is placed on dryer connections. Union joints or flexible connections are recommended to relieve stress. Also, properly support the piping as needed with hangers or brackets. Air piping must be installed by a qualified pipefitter.

   An after-cooler (air-cooled or water-cooled) must be installed between the air compressor and the dryer. Installing the dryer without the proper after-cooler will bring high inlet-temperature compressed air to the air dryer, which will cause premature failures. After-coolers must be followed by an efficient separator with an automatic drain to remove the condensed moisture before the compressed air reaches the air dryer.

   If the condensed water is not removed at the after-cooler/separator/drain, it will reduce the cooling capacity of the air dryer. After-coolers will condense approximately two and a half to three times more water than that of the air dryer.

4. Electronic timer operated drains are standard on all cycling dryers. A particle strainer with shut-off valve is installed upstream of the drain valve.

   All drain outlets may be combined for common condensate disposal. Dispose of the condensate in compliance with local and federal government requirements.

⚠ CAUTION

Do not combine any two or more drain inlet lines through one single automatic drain. This type of installation leads to pressure differentials from the points of drainage and will cause closed loop compressed air flow. This will reduce or eliminate the proper drainage through the automatic drain valve.

⚠ WARNING

Drain outlet tubing will periodically contain pressurized air. An unsecured drain tube will whip around potentially causing bodily injury.

5. For water-cooled air dryers, connect cooling water lines to the water-cooled condenser from the water supply as specified on the dryer specifications. Condenser water pressure must be a minimum of 35 PSIG.

   Strainers are recommended at the water inlet to the condenser. Proper chemical treatment is recommended for cooling tower water to avoid scaling and sludge inside the condenser.

⚠ CAUTION

Do not reduce pipe sizes connected to air, water and drain lines. They should be the same or larger than sizes supplied on the dryer to avoid excess pressure loss.

6. Connect electric power, according to the nameplate power requirements, to the electrical terminals. The refrigerated dryer is designed to cycle; therefore, it must be wired separately from the air compressor. The dryer must not cycle with the air compressor. All units are pre-wired internally.

   Follow the recommendations on the electrical drawing for the fuse size and the incoming power details. Connect the power to the air dryer only through a properly sized fused disconnect switch.

⚠ WARNING

Wiring connection to the dryer must meet the national (NEC) and local electrical code requirements. Check the voltage specified on the nameplate to the electrical power connecting to the dryer. Electrical connections must be made by a qualified electrician.

START-UP AND OPERATION

GENERAL

1. Energize the crankcase heater by closing the disconnect switch to the dryer for 10 hours (minimum) before start-up. Crankcase heater will maintain a temperature above the rest of the system to evaporate all the liquid refrigerant in the crankcase, and also to avoid migration of liquid to the crankcase. Any liquid in the crankcase at the time of start-up can cause compressor valve breakage.

⚠ CAUTION

CRANKCASE HEATER

Air dryers with three-phase power supply are equipped with a compressor crankcase heater. This heater must be energized by closing the disconnect switch a minimum of 10 hours before start-up. Power to the air dryer can be left on to energize the crankcase heater for off-cycle, during evening or weekend shutdowns.

⚠ CAUTION

STARTING THE DRYER WITHOUT ENERGIZING THE CRANKCASE HEATER WILL CAUSE PREMATURE FAILURES OF THE REFRIGERANT COMPRESSOR. Failure to comply with procedure of energizing crankcase heater before start-up may void warranty.

2. For water-cooled Air Dryers (QPCD) make sure the water supply (Minimum Pressure 35 PSIG) is available at the condenser inlet. The water regulating valve will modulate and control the water flow with respect to the dryer load conditions. The water-cooled condenser drain plug (located inside enclosure) must be installed.
3. For open frame design units (Models QPCD-750 & larger), the following valves **must be open** prior to start-up. All valves are tagged with specific instructions.
   a. Compressor isolation valves (suction & discharge service valves).
   b. Receiver valve(s) (air-cooled models only).
   c. Condenser outlet liquid line valve (water-cooled models only).
4. Turn the ON/OFF switch to the "ON" position. Power ON light will turn on, Chilled Mass circulating pump and refrigeration compressor will start.
5. Refrigerant suction pressure will lower from the idle pressure to the normal operating pressure. The Chilled Mass pump will circulate the cooling media through the air-to-CM heat exchanger to cool the compressed air. The Chilled Mass will be brought down to normal operating temperature within 15-20 minutes of start-up if it is allowed to do so without compressed air running through the dryer.
6. Chilled Mass circulates through the air-to-CM heat exchanger, picking up heat from the compressed air and then passes through the CM-to-refrigerant heat exchanger, thus cooling down to the desired temperature again. Chilled Mass circulates through the system, exchanging cooling and heat between the compressed air and refrigerant.
7. As the air cools down to the preset dewpoint temperature, the thermostat in the air stream (coldest point) cycles off the refrigeration compressor. The Chilled Mass circulating pump runs continuously, exchanging cooling to the compressed air. The compressed air temperature will start rising to a preset temperature to turn on the compressor. The compressed air dewpoint is maintained within the factory setpoints of the cycling thermostat.
8. If the dryer is turned on without any compressed air, the pump and compressor will operate as normal until the Chilled Mass temperature sensing thermostat is satisfied. At this condition of no load, the compressor will cycle off for a long time until the Chilled Mass temperature is raised to the thermostat setting, which will turn on the compressor.

9. The dryer can be left on regardless of the load condition. If extended no-load conditions are anticipated, the dryer may be turned off by turning the ON/OFF switch to the "OFF" position. This will leave the crankcase heater energized for higher energy savings.
10. The thermostatic expansion valve controls the cooling by metering the amount of refrigerant introduced into the CM-to-refrigerant heat exchanger. This device is factory set (superheat) for proper operation. Any readjustment, if needed, must be done by a certified refrigeration technician.
11. It is recommended that the cycling thermostats NOT be readjusted in the field. Any unauthorized adjustment may cause a freeze-up and premature failure of the dryer.
12. Refrigerant low and high-pressure switches are factory set to operate automatically for any load condition up to full load. If either one of these two switches are tripped, the "High Temp" light will come on. These safeties reset automatically and resume operation if the fault condition is rectified.
13. The refrigeration compressor is internally (thermally) protected. If the compressor trips on internal overload, it will reset automatically and resume operation.
14. Fan motors are thermally protected and cycled to maintain a steady discharge pressure (on air-cooled units, QPCD models). Check for proper rotation.
15. The Chilled Mass pump motor is thermally protected for safe operation. This pump will always run regardless of the load condition.
16. Condensate (water) separated from the compressed air is drained from the heat exchanger and from the moisture separator. Two electronic timer-operated solenoid valves automatically drain all the condensate. Particle strainers with isolation valves are installed before the solenoid valves for the trouble free operation of the auto drains. Dispose of condensate properly, meeting the requirements of local, state and federal regulations regarding oil/water condensate.

⚠ CAUTION

Contact factory before authorizing any warranty refrigeration service on the air dryer. Identify the dryer by model and serial numbers when calling factory.

MASTER CONTROL OPERATION (MC)

(Available on some models as standard and others as an option.)

The Master Control is capable of 4-channel temperature display, drain control, and service due and alarm indication.

Temperature Display

The Master Control (MC) is capable of 4-channel temperature display. The unit displays refrigerant suction temperature (measured immediately downstream from the refrigerant/air heat exchanger), incoming air temperature, ambient air temperature (or incoming water temperature for units with a water-cooled condenser), and dew point temperature (optional). Only one temperature can be displayed on the LCD screen at a time. In the normal operational mode, pushing the UP (↑) or DOWN (↓) arrow keys will cycle the temperature displayed, while LEDs on the MC unit indicate which temperature is being displayed. Pushing the SELECT key will cycle between Fahrenheit and Celsius temperature scales. The LED labeled "OPTIONAL" corresponds to the dew point temperature. If your unit does not include this option, the temperature displayed when the "OPTIONAL" LED is lit will be about 30° by default. This does NOT indicate that the dew point is actually 30°.

Drain Operation

Locking/Unlocking Drain Time Settings: The ON TIME and OFF TIME settings for all modes of drain operation can be unlocked or locked to avoid inadvertent changes to these settings. In the unlocked condition, the time settings will flash after the SELECT key is pressed momentarily, indicating that the values can be changed by pressing the UP (↑)or DOWN (↓) arrow keys. In the locked condition, the SELECT key must be held down for 5 seconds before the display will flash and the settings can be changed. With the display flashing, pushing the SELECT key momentarily will return to normal unlocked operation and holding the SELECT key down for 5 seconds will return to normal locked operation.

Setting Drain ON TIME and OFF TIME:

1. Press the UP (↑) or DOWN (↓) arrow keys until the LED indicates that ON TIME or OFF TIME has been selected.
2. Press SELECT momentarily (if unlocked) or hold until the display starts flashing (if locked). If you do not know whether the setting is locked or not, simply press the select button momentarily. If the digits on the LCD display do not start flashing, the setting is locked.
3. Press UP (↑) or DOWN (↓) arrow keys to change the settings. The ON TIME is indicated in seconds and changes in 0.5-second increments in a range of 0 to 60 seconds. The OFF TIME is indicated in minutes and changes in 0.5-minute increments in a range of 0 to 60 minutes.

Modes of Drain Operation: The Master Control (MC) has two modes of drain operation for different drain types. The mode of operation for timed drains is described below as item "A." The mode of operation for fully automatic float operated drains is described as item "B." For all modes, the "DRAINS POWER ON" LED indicates that the drain is receiving power. Pushing the DRAIN TEST key will send power to the drain if it is not already receiving power.

A. Timed Drain Mode:

Set ON TIME and OFF TIME to non-zero values. Settings should be such that fluid is adequately drained without allowing excessive air loss.

B. Demand Drain Mode:

Set ON TIME and OFF TIME to zero. Drain is given continuous power supply and will operate normally. In this mode, pushing the DRAIN TEST button will have no effect.

Alarm Indication

The following conditions can cause the alarm indicator to light:

- Compressor overload
- Low refrigerant suction pressure
- High refrigerant discharge pressure
- Low oil pressure (semi-hermetic compressors only)

A qualified refrigeration mechanic should identify and correct the problem if an alarm condition occurs. **In most cases it will be necessary to firmly depress the reset push-button located on the dual-pressure switch, which is inside the electrical enclosure.** Follow all safety procedures applicable to electrical equipment when opening the electrical enclosure. Refer to the Installation, Operation, Start-Up, and Maintenance Manual for more information.

Service Due Indication

"Service Due" indicates the dryer is due for routine maintenance. Please read the maintenance section or contact your Quincy dealer. In SERVICE DUE mode, several functions relating to the accumulated run time can be accessed. The accumulated run time can be viewed, and the service due threshold (total accumulated run time before SERVICE DUE indicator lights) can be viewed and tested.

⚠ CAUTION

Drains will not operate normally in Service Due mode. Drains will not receive power in Service Due mode unless the DRAIN TEST key is held down. Never operate the unit in Service Due mode for an extended period of time.

To enter the SERVICE DUE mode (and view the accumulated run time) press SELECT, UP (↑) and DOWN (↓) keys simultaneously. The display will show the accumulated run time in tens of hours. If the display reads 50, for example, the accumulated run time is 500 hours.

1. To display the service due threshold, hit the DOWN (↓) arrow key. The service due indicator will light.
2. To test the service due timer function, push the SELECT and UP (↑) keys simultaneously. The accumulated run time will temporarily be set to a value that is 60 seconds less than the service due threshold setting. If the service due timer is

functioning properly, the SERVICE DUE indicator will flash after the 60 seconds has elapsed. After a few seconds, SERVICE DUE mode will return to normal operation. The indicator will stop flashing and the accumulated run time will return to its previous value.

3. To reset the accumulated run time to zero, hold the SELECT key for 5 seconds.

To exit SERVICE DUE mode, press the UP (↑) and DOWN (↓) keys simultaneously. This can not be done while a service due timer test is in progress.

SHUTDOWN PROCEDURE

1. Open the bypass valve to allow process flow to continue downstream. Then close the outlet isolation valve on the dryer bypass piping.
2. Close the inlet isolation valve on the dryer bypass piping. At this time the dryer is isolated and can be depressurized, ready for servicing.
3. Turn the power switch to the OFF position.

NOTE: The alarm indication light (red) signifies the refrigerant compressor is not running. The reasons can be:

- Low suction pressure
- High discharge pressure
- Electrical problems
- Loss of refrigerant
- Dirty condenser
- Leaking evaporator, etc.

Refer to Troubleshooting Guide, Page 16, for problem analysis and remedy. Call the factory if further assistance is required.

THEORY OF OPERATION

Quincy Chilled Mass Cycling Dryers (QPCD models) cycle the refrigeration compressor by sensing the actual compressed air dewpoint temperature (1TH). A second thermostat (2TH) senses the Chilled Mass (CM) temperature to cycle the compressor at low-load condition only.

Compressed air enters the incoming or shell side of the air-to-air heat exchanger, pre-cooled by the outgoing cold air from the separator. Air then enters the air-to-Chilled Mass heat exchanger to be cooled by the cold CM circulated by a centrifugal pump. Air leaving this heat exchanger is cooled to the dewpoint temperature. Cold air with condensed moisture droplets enters a five-step centrifugal separator where the moisture is removed. Separated moisture is discharged from the system through an auto drain. Another auto drain removes moisture from the heat exchangers. Dual drains ensure complete condensate drainage on Quincy CM Cycling Dryers. Cold and dehumidified compressed air enters the air-to-air heat exchanger and is warmed by the incoming wet air.

The cycling thermostat sensing bulb is installed in the air stream at the outlet of the air-to-CM heat exchanger to cycle the refrigeration compressor based on actual dewpoint temperatures. This method ensures steady dewpoint air delivered out of these dryers. A second cycling thermostat installed in the CM monitors the media temperature. In the event of a low-load condition, the CM temperature will lower to a preset thermostat setting and cycle the refrigeration compressor off.

The refrigeration system includes standard refrigeration controls. The compressor cycling feature is based on the compressed air temperature which eliminates the need for a hot gas bypass (capacity controller) in our cycling dryers.

The refrigeration system is oversized to match the load. Because the refrigeration suction operating temperature is lower in a cycling dryer than a non-cycling dryer, the BTU/hr. output of cycling systems are reduced. To compensate for the reduction in refrigeration capacity, larger systems (HP and BTU/KW) are employed to deliver the designed dewpoint, therefore avoiding dewpoint spikes.

Chilled Mass circulated throughout the system transfers cooling efficiently by CONDUCTION and CONVECTION principles of heat transfer. Hydronic controls maintain the smooth and trouble free circulation of the Chilled Mass.

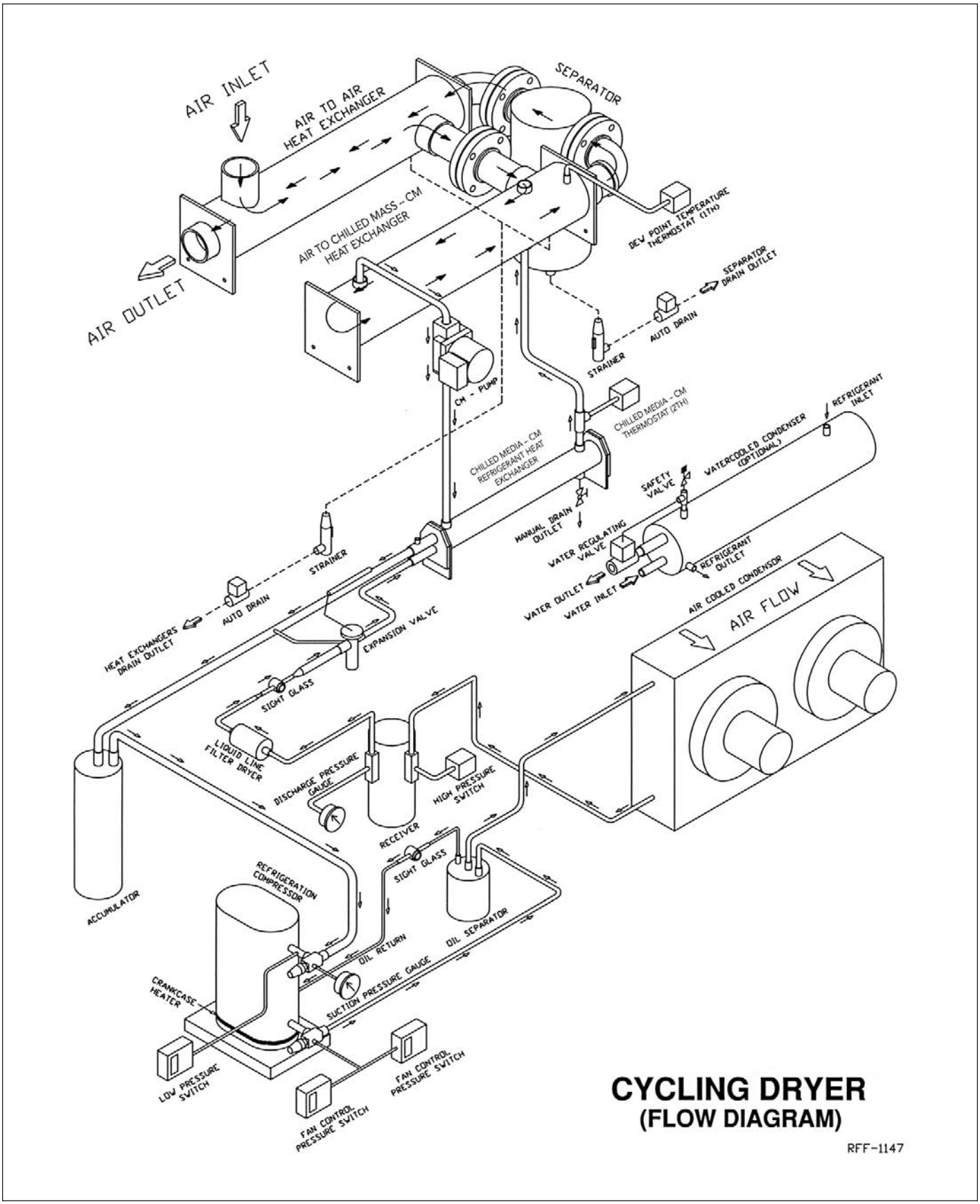


FIGURE 2 — CYCLING DRYER FLOW DIAGRAM

OPERATING CONDITIONS

Entering Air Temperature

Units are designed for entering air temperature of 100°F (120°F max). If the temperature of entering air is to be greater than 100°F, the factory should be consulted to determine the maximum possible air flow through the unit.

⚠ CAUTION

Increased heat content or higher temperature air requires the dryer to be oversized to prevent overloading of the refrigerant compressor.

Entering Air Pressure

Standard units are designed for operating air pressure of 100 PSIG (150 PSIG MAX.). Operating below 100 PSIG will reduce system capacity.

Ambient Air Temperature

The allowable ambient temperature range is 40°F to 110°F.

OPERATING RANGE AND CONTROL SETTINGS

1. **Inlet Air Temperature:**
   100°F design 120°F maximum
2. **Inlet Air Pressure:**
   100 PSIG design 150 PSIG maximum
3. **Ambient Air Temperature:**
   40°F to 110°F
4. **Cooling Water Temperature:**
   55-90°F
5. **Cooling Water Pressure:**
   35 PSIG minimum
   100 PSIG maximum
6. **Refrigerant Suction Pressure:**
   22-50 PSIG (operating range)
   90-150 PSIG (cycle off range)
7. **Cycling Thermostat (air side, 1TH):**
   36°F (cycle off)
   48°F (cycle on)
8. **Cycling Thermostat (Chilled Media [glycol] side, 2TH):**
   33°F (cycle off)
   39°F (cycle on)
9. **Refrigerant Discharge Pressure:**
   235 to 272 PSIG (R-404a air-cooled unit)
   235 to 245 PSIG (R-404a water-cooled unit)
   135 to 275 PSIG (R-22 air-cooled unit)
   190 to 210 PSIG (R-22 water-cooled unit)
10. **Refrigerant Low Pressure Switch:**
    CUT OUT 58 PSIG (R-404a)
    CUT IN Manual Reset (R-404a)
    CUT OUT 20 PSIG (R-22)
    CUT IN Manual Reset (R-22)
11. **Refrigerant High Pressure Switch:**
    425 PSIG (R-404a air-cooled unit)
    385 PSIG (R-404a water-cooled unit)
    375 PSIG (R-22 air-cooled unit)
    325 PSIG (R-22 water-cooled unit)
12. **Fan Control #1:**
    CUT OUT 225 PSIG (R-404a)
    CUT IN 280 PSIG (R-404a)
    CUT OUT 135 PSIG (180 PSIG*) (R-22)
    CUT IN 230 PSIG (220 PSIG*) (R-22)
13. **Fan Control #2:**
    CUT OUT 240 PSIG (R-404a)
    CUT IN 295 PSIG (R-404a)
    CUT OUT 195 PSIG (230 PSIG*) (R-22)
    CUT IN 275 PSIG (190 PSIG*) (R-22)

** Settings on the adjustable controls*

MAINTENANCE

CABINET ACCESS

For models QPCD-100 to QPCD-200 the side panels can be removed for servicing. A 1/4" socket or standard screwdriver is required. When installing the panels after service, do not over tighten the panel screws. Over tightening may result in damage to the screw and panel.

For models QPCD-250 to QPCD-600 the dryer top, front and rear panels can be removed without tools. To remove the dryer top, stand at one end of the dryer and grasp the front and rear corners. Lift up and the top cover will pop off. Do this on the other end and then remove. The front and rear panels can be removed by inserting your fingers into the holes on the upper right and left side of the panel. Grasp and pull up to remove. To re-install, line up the panel mounting hooks with the slots on the dryer frame. Push the panel in and then down to lock.

AIR DRYER MAINTENANCE

The dryer is factory tested before shipping. All controls are calibrated for automatic operation. If the dryer is installed in clean surroundings, within the temperature limits of the specified ambient, the dryer will run trouble-free for a very long time. Routine maintenance procedures recommended are the following:

1. Checking the fan motor(s) for proper operation to maintain the cooling air to be drawn through the condenser and blown over the refrigerant compressor. If the dryer is equipped with condenser ambient filters, check, clean or replace as needed to maintain the proper air flow through the condenser.

   Dirty ambient filters will reduce the air flow through the condenser, and trip the compressor "off" at the overload control.

2. For dryers without ambient filters, clean the condenser periodically to maintain the proper heat transfer on the condenser coil. A dirty condenser will raise the head pressure of the refrigeration system and trip the compressor "off" at the overload control.

   Running the compressor on high head pressures may cause premature failures. Check the ambient temperature limits to be maintained at the installation.

3. Check and clean watercooled condensers for dirt, scale and sludge buildup every year or as needed. Cooling tower water condensers may need cleaning more often if the water is not properly treated.

4. Check the suction pressure gauge. Readings should be in the specified range while the compressor is running. When the compressor is not running, the gauge will read idle pressure.

5. Check the pressure drop across the air dryer at full capacity flow. If it is higher than specified value (normally 5 PSI or less), consult factory. If pressure drop increases over years of operation, it may be due to particulate buildup from air compressor intake. In that event, back-flush the dryer with any **MILD DETERGENT**. See Figure 3.

   To back-flush, disconnect air dryer, plug the drain line and fill the air system with the detergent water solution. Hold it for four to six hours. Circulate the detergent from air outlet to air inlet with a pump. Flush the system with warm water. If pressure-drop still exists, contact factory.

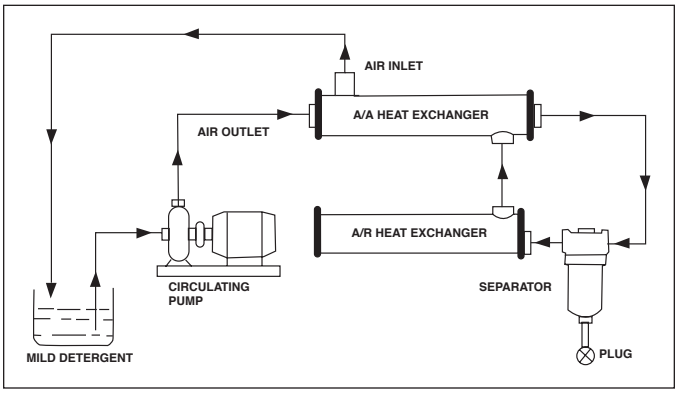


FIGURE 3 — BACK FLUSH FLOW DIAGRAM

6. **Glycol Circulating Pump:** This pump is permanently lubricated and should require minimal maintenance. Check the pump nameplate or pump maintenance manual for specific maintenance instructions.

7. **Chilled Mass System:** This closed-loop Chilled Mass system is factory charged and will not require any additional filling in the field under normal operation. Periodically check within the dryer for any Chilled Mass leakage.

8. **Cycling Thermostats:** These do not need any maintenance under normal operating conditions. It is recommended that the cycling thermostats NOT be readjusted in the field. Any unauthorized adjustment may cause a freeze-up and premature failure of the dryer.

9. **Automatic Drains:** The recommended settings for the drain time is determined by the moisture load. The cycle time should be adjusted to approximately three to four minutes. The drain time should be set so the drain expels all of the liquid and then a short burst of air. Periodically check the automatic drains for proper drainage. If the drains are not functioning, or not set correctly, the condensed moisture may be re-entrained downstream of the air dryer. Adjust the drain/cycle intervals, on the dryer panel, as needed, for proper drainage of all condensed moisture.

   If the solenoid valve is stuck open, remove the valve from the air system and clean with soap and water. Then use compressed air to clean the valve seat. Automatic drains should be periodically tested manually, using the test switch mounted on the dryer panel.

10. **Particle Strainer:** Immediately in front of the solenoid drain valves, a particle strainer with shut-off valve is installed. Periodic cleaning of this strainer is required to protect the solenoid valve and to ensure proper condensate drainage. To clean the strainer, close the shut-off valve, depressurize the drain line by manually depressing the test switch mounted on the dryer panel, remove the strainer cap and screen and clean with water and compressed air. Reassemble screen and screw cap in place and open shut-off valve.

11. **Compressor:** Refrigerant compressors normally do not need any maintenance. It is very common for the refrigerant compressor to cycle on and off in normal operation. If servicing is needed, it must be done by a certified refrigeration technician.

12. **Expansion Valve:** Cycling air dryers come equipped with a thermostatic expansion valve, factory set to maintain a superheat of 8-10°F. These valves do not need any field adjustment in normal operation. Generally, superheat adjustments are needed only at the time of valve replacement. Expansion valve service must be performed by a certified refrigeration technician.

⚠ WARNING

Under federal regulation any refrigeration service must be performed only by a certified refrigeration technician. Failure to comply with federal regulations can mean penalties and/or large fines.

Drain Valve Clean Up Procedure

A. Depressurize the drain valve.
B. Disconnect the power source.
C. Remove the valve from the compressed air system.
D. Remove the solenoid coil.
E. Remove the stainless steel sleeve from valve body.
F. Clean the valve body internals, and all other components.
G. Assemble the valve parts.
H. Connect the solenoid coil.
I. Install the drain valve in the system.

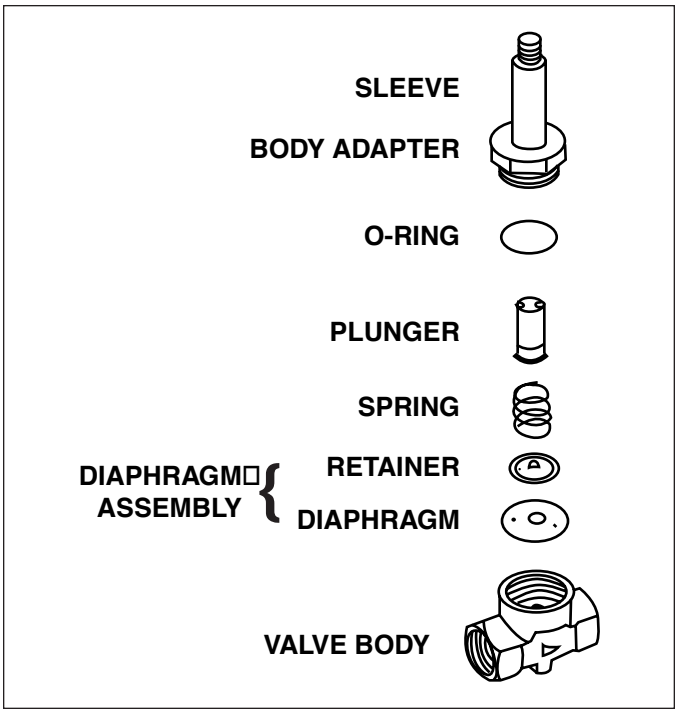


FIGURE 4 — DRAIN VALVE

Recommended Operation and Maintenance for the Particle Strainer

The particle strainer should be cleaned once every week or as needed.

1. Close the shut-off valve on the particle strainer.
2. Depressurize the drain by pressing the manual override switch.

⚠ CAUTION

Failure to depressurize may cause bodily injury.

3. Unscrew bottom of the particle strainer and clean the screen.

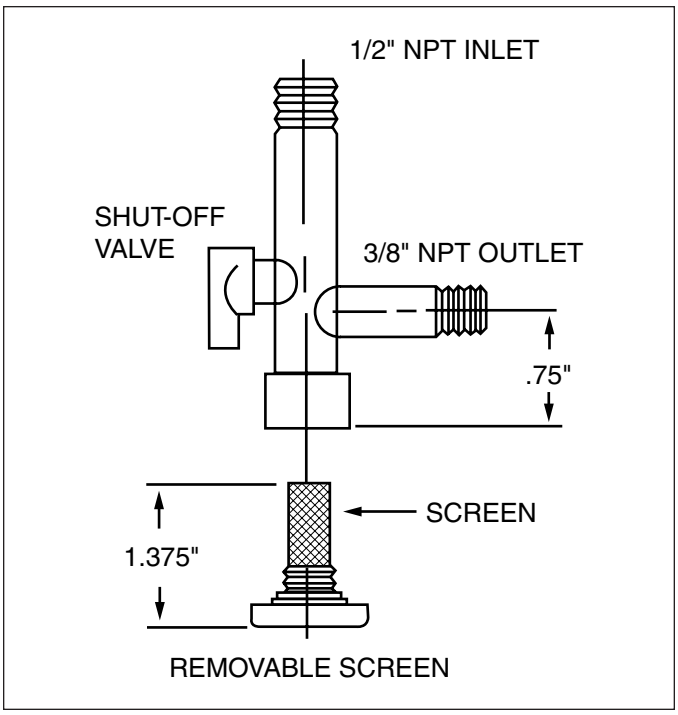


FIGURE 5 — PARTICLE STRAINER

REFRIGERATED AIR DRYER SERVICE CHECKLIST

Please get answers to as many questions as you can before writing or calling for service.

1. Customer's Name _____
   Phone no. _____ Fax no. _____
2. Model no. _____ Serial no. _____
   Voltage L1 _____ L2 _____ L3 _____ PH _____ HZ _____
   Amp draw L1 _____ L2 _____ L3 _____
   Actual air flow (SCFM) _____ HP _____
3. Description of problem

   _____

   _____

   _____

   _____

   _____

   _____

   _____

   _____
4. Air in temperature (°F) _____
5. Air out temperature (°F) _____
6. Air in pressure (PSIG) _____
7. Air out pressure (PSIG) _____
8. Refrigerant suction pressure when unit is operating (PSIG) _____
9. Refrigerant suction pressure when unit is not operating (PSIG) _____
10. Refrigerant discharge pressure when unit is operating (PSIG) _____
11. Inspect refrigerant suction line at the outlet of air to refrigerant heat exchanger:
    Cold _____ Hot _____ Temperature (°F) _____
12. Inspect refrigerant suction line at inlet of compressor: Temperature (°F) _____
13. Oil pressure when unit is operating (PSIG) _____
14. Separator skin temperature (°F) _____
15. Location of unit Indoor _____ Outdoor _____
    Clean _____ Dusty _____
16. Ambient temperature (°F) _____ Air-cooled condenser clean? Yes _____ No _____
17. a. Water-cooled condenser: City _____ Tower _____
    b. Inlet water temperature (°F) _____ Outlet water temperature (°F) _____
    c. Inlet water pressure (PSIG) _____ Outlet water pressure (PSIG) _____
18. Inspect auto drain, operation: Stuck open _____ Stuck closed _____

NOTE: Maintenance Personnel, Copy This Page, Fill In Form and contact Quincy Compressor.

TROUBLESHOOTING

The following conditions can cause abnormal operation or malfunction of the air dryer

- High inlet air temperature.
- High cooling water inlet temperature.
- Untreated or contaminated cooling water.
- Dirty condenser.
- Low or high ambient temperature.
- Malfunctioning automatic drains at the aftercooler separator or air dryer.
- Refrigerant over or under charge.
- Leaky evaporator.
- Electrical power supply more than ±10% of the rated voltage.
- Low inlet air pressure.
- Condenser water pressure below 35 PSIG.
- Compressed air flow greater than rated capacity.
- Undersized fuses.

If any of these symptoms are noticed, refer to the Troubleshooting Guide.

Table 1 — Troubleshooting Guide

Symptoms	Cause	Remedy
A. Unit does not run in the running mode. **NOTE:** In normal operation compressor cycles on two thermostats. 1. Dewpoint temperature sensing thermostat (1 TH). 2. Chilled Mass temperature sensing thermostat (2 TH). When these thermostats are satisfied the compressor does not run.	1. Motor line open. 2. Fuse blown. 3. Tripped overload. 4. Safety controls open. 5. Air switch open. (Dead end control) 6. Frozen (locked) compressor. 7. Wiring improper or loose.	1. Close disconnect switch, to start. 2. Replace fuse. 3. Turn switch off, wait 15 minutes, check for overload condition. Resets automatically. 4. Repair or replace. 5. Check air pressure. Adjust air and/or switch. If defective, repair or replace. 6. Repair or replace. 7. Check wiring against diagram.
B. Unit short cycles in the running mode. **NOTE:** In normal operation, compressor may short cycle on certain load conditions.	1. Motor compressor overload cutting out. 2. Shortage of refrigerant. 3. Suction pressure low. 4. Sticking expansion valve.	1. Check for high head pressure, clogged condenser, high ambient, or air overload. Check high pressure cutout, repair or replace. 2. Repair leak and recharge. 3. Check hot gas bypass. Adjust, repair or replace. 4. Repair or replace.
C. Compressor will not start – hums.	1. Improper wiring. 2. Low line voltage. 3. Relay or contactor not closing. 4. Single phasing. 5. Locked up compressor.	1. Check and correct wiring against diagram. 2. Check voltage – correct. 3. Check for reason – repair or replace. 4. Check fuses. 5. Replace.

Table 1 — Troubleshooting Guide, continued

Symptoms	Cause	Remedy
D. Compressor starts and runs – short cycles on overload.	1. Low voltage, or phase unbalance. 2. Additional current going thru overload. 3. Overload protectors defective. 4. High discharge pressure. 5. Short in winding.	1. Check voltage to be within ±10% of voltage listed on nameplate. 2. Check wiring diagram, check for added electrical devices connected thru protector. 3. Check current, replace. 4. Refer to E, 1 – 9. 5. Check resistance, replace compressor.
E. Head pressure too high.	1. Refrigerant overcharge. 2. Air in system. 3. Dirty condenser (air-cooled). 4. Location too hot. 5. Defective condenser fan cycling switch(es). 6. Defective fan motor(s). 7. Fan operating in wrong direction. 8. Defective water regulating valve. 9. Dirty condenser (water-cooled).	1. Purge or vacuum and recharge. 2. Check for reason, repair. 3. Blow clean with compressed air. 4. Cool ambient, relocate unit, add ventilation. 5. Repair or replace. 6. Replace. 7. Switch two wires. 8. Adjust, repair or replace. 9. Clean water-side by rodding or chemical cleaning.
F. Head pressure too low.	1. Refrigerant shortage. 2. Compressor suction or discharge valves inefficient. 3. Defective condenser fan cycling switch(es). 4. Defective water regulating valve.	1. Repair leak and recharge. 2. Repair or replace. 3. Repair or replace. 4. Adjust, repair or replace.
G. Noisy unit.	1. Mountings loose. 2. Bent fan blade. 3. Fan motor bearing worn. 4. Refrigerant flooding back.	1. Tighten mounting, etc. 2. Straighten or replace blade. 3. Replace. 4. Check expansion valve, adjust, repair or replace. Check crankcase heater.
H. Frosted liquid line.	1. High side service valve partially closed or restricted. 2. Restricted filter/dryer.	1. Open valve or remove restriction. 2. Replace.
I. Top condenser coils cool when unit in operation.	1. Refrigerant shortage. 2. Compressor inefficient.	1. Repair leak and recharge. 2. Repair or replace.

Table 1 — Troubleshooting Guide, continued

Symptoms	Cause	Remedy
J. Unit runs but air temperature is high. **NOTE:** Outlet air temperature gauge may read higher than actual temperatures at low air flow conditions.	1. Refrigerant leak. 2. Expansion valve out of adjustment. 3. Filter/dryer clogged. 4. Refrigerant shortage. 5. Dirty condenser. 6. Air in system. 7. Compressor inefficient. 8. Defective insulation. 9. Air overload. 10. Unit too small. 11. High ambient. 12. Entering air temperature too high. 13. Circulating pump not running. 14. Chilled Mass leaked out. 15. Cycling thermostats out of adjustment.	1. Locate with leak detector. Repair or replace defective part. 2. Adjust. 3. Replace. 4. Repair leak and recharge. 5. Clean condenser. 6. Check reason, repair, vacuum, recharge. 7. Repair or replace. 8. Repair or replace. 9. Reduce load. 10. Add unit or replace. 11. Add ventilation or change location. 12. Lower entering air temperature. Check aftercooler. 13. Repair or replace. 14. Check for leaks. Repair and fill with fluid. 15. Readjust to specification.
K. Unit runs but low outlet air pressure.	1. System pressure low. 2. Precooler and/or evaporator clogged. 3. Incorrect piping. 4. Air overload. 5. Unit too small. 6. Excess water in unit. 7. Clogged air compressor intake filter. 8. Dirty air system.	1. Increase pressure. 2. Back flush using mild detergent, Figure 3, Page 12. 3. Increase line size and/or correct piping as required. 4. Reduce airflow. 5. Add another unit or replace with larger unit. 6. Check drain, repair or replace if needed. 7. Clean or replace air intake filter. 8. Back flush as described in Figure 3, Page 12.
L. Unit runs, but air flow erratic or zero.	1. Air-side freeze-up. 2. Heat exchanger(s) clogged. 3. Restriction in piping upstream.	1. Check and adjust thermostat(s). 2. Refer to K-2 above. 3. Correct as required.
M. Airside freeze-up.	1. Cycling thermostat(s) out of adjustment.	1. Check specifications and re-adjust.
N. Wrong condenser fan rotation.	1. Improper power connections (three phase only).	1. Reverse two wires.

Quincy COMPRESSOR

Parts List

Model QPCD-100
Voltage: 115-1-60 R-134A

PART DESCRIPTION	PART NO.	QTY.
Refrigerant Compressor .75HP R-134A	QRF-003109	1
Fan Motor	QRF-000794	2
Fan Blade	QRF-000774	2
Liquid Line Filter	QRF-001123	1
Expansion Valve	QVA-001783	1
Hot Gas Bypass Valve	QVA-000579	1
Fan Cycling Switch 1	QRF-002079	1
Fan Cycling Switch 2	QRF-002079	1
Thermostat	QEC-002372	1
Relay	QCA-000507	1
Power On/Off Switch	QRF-002929	1
Suction Pressure Gauge	QGM-000318	1
Drain Valve 2-Way Solenoid Valve .375"	QVA-003111	1
Drain timer	QEC-000486	1
Y-Strainer .375"	QRF-001210	1
Y-Strainer Screen	QFT-003845	1

MODEL	CAPACITY	HP	SHIPPING WEIGHT	
			LBS.	KG.
QPCD-100	100 SCFM (170.0 NM3/HR)	3/4	200	91
QPCD-125	125 SCFM (212.5 NM3/HR)	3/4	210	95
QPCD-150	150 SCFM (255 NM3/HR)	3/4	220	100
QPCD-200	200 SCFM (340 NM3/HR)	1	220	100

OPERATING CONDITIONS

MAX. INLET TEMPERATURE:	100°F (38°C)
MAX. AMBIENT TEMPERATURE:	100°F (38°C)
MIN. AMBIENT TEMPERATURE:	40°F (4°C)
INLET PRESSURE:	100 PSIG (7.0 KG/SQ.CM)
DESIGN PRESSURE:	150 PSIG (10.5 KG/SQ.CM) OPTIONAL (200 PSIG (14.1 KG/SQ.CM))
DEW POINT TEMPERATURE:	36 TO 48°F
AIR CONNECTIONS:	1" NPT
REFRIGERANT:	R-134a
AUTOMATIC DRAIN:	ELECTRONIC TIMER OPERATED
DRAIN LINE:	3/8" O.D. TUBING

NOTE:
THE HOT, NEUTRAL AND GROUND WIRES FOR CUSTOMER CONNECTIONS ARE LOCATED ON THE COMPRESSOR TERMINAL BOX.

STANDARD ACCESSORIES

1 - MASTER CONTROLLER
2 - REFRIGERANT SUCTION PRESSURE GAUGE
3 - POWER ON/OFF SWITCH
4 - DIGITAL DISPLAY READOUT
5 - SELECT PUSH BUTTON
6 - DRAIN TEST PUSH BUTTON
7 - SCROLL UP PUSH BUTTON
8 - SCROLL DOWN PUSH BUTTON
9 - AIR IN TEMPERATURE LIGHT
10 - CHILLED MEDIA TEMPERATURE LIGHT
11 - OPTIONAL LIGHT
12 - AMBIENT TEMPERATURE LIGHT
13 - DRAINS POWER ON LIGHT
14 - TEMPERATURE LIGHT (°F)
15 - TEMPERATURE LIGHT (°C)
16 - ALARM LIGHT
17 - DRAIN OFF TIME LIGHT (MINUTES)
18 - DRAIN ON TIME LIGHT (SECONDS)
19 - COMPRESSOR RUNNING LIGHT
20 - SERVICE DUE LIGHT
21 - REFRIGERANT DUAL PRESSURE CONTROL

ELECTRICAL POWER SUPPLY

115V-1PH-60HZ or
110V-1PH-50HZ or
208/230V-1PH-60HZ or
220/240V-1PH-50HZ
(CUSTOMER POWER SUPPLY MUST MATCH DRYER NAMEPLATE VOLTAGE)

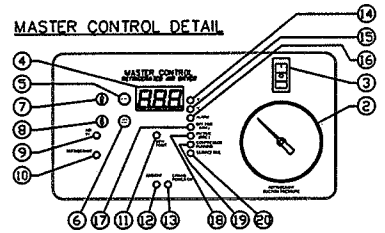
STANDARD ACCESSORIES

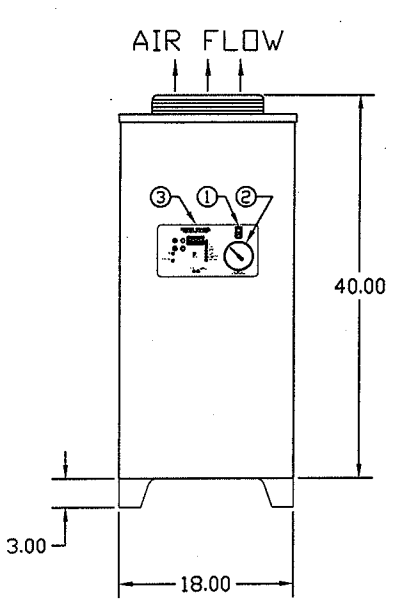
1 - POWER ON / OFF SWITCH
- POWER ON LIGHT
- COMPRESSOR OFF LIGHT
2 - REFRIGERANT SUCTION PRESSURE GAUGE
3 - ELECTRONIC DRAIN VALVE CONTROLS

OPTIONAL ACCESSORY

A - LOW AMBIENT HEADMASTER CONTROL
B - AIR IN PRESSURE GAUGE
C - AIR IN TEMPERATURE GAUGE
D - AIR OUT PRESSURE GAUGE
E - AIR OUT TEMPERATURE GAUGE
F - DEW POINT TEMPERATURE GAUGE
G - REFRIGERANT DISCHARGE PRESSURE GAUGE
H - AMBIENT FILTERS
I - REFRIGERANT DUAL PRESSURE CONTROL
J - WATER COOLED CONDENSER
K - CUPRO-NICKEL W/C CONDENSER
L - LOW AIR PRESSURE SHUT-DOWN SWITCH
M - 200 PSIG MAX. WORKING PRESSURE
N - ELECTRICAL SUPPLY CORD - 6' (1829mm)

MASTER CONTROL DETAIL





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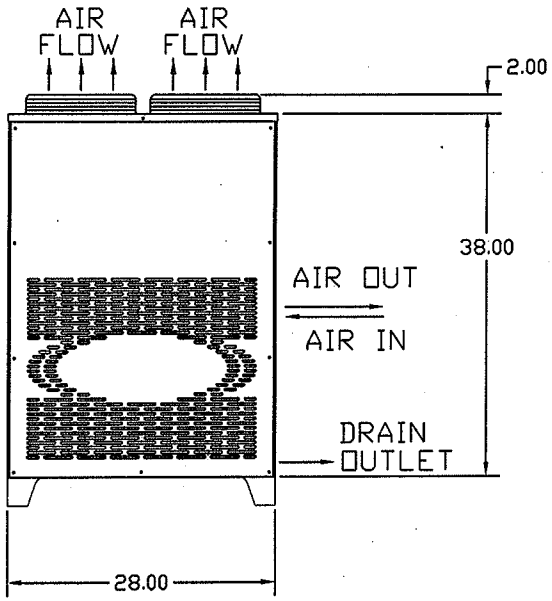
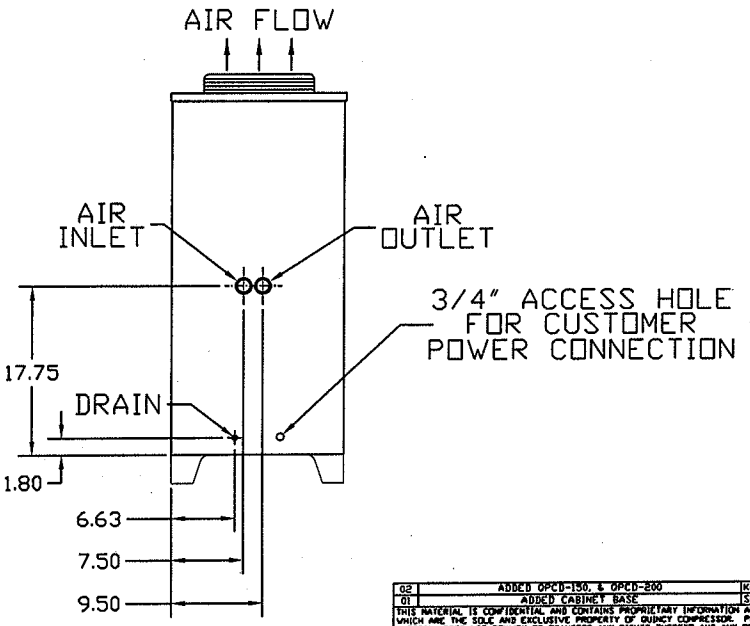


RIGHT SIDE



BACK

02	ADDED QPCD-150, & QPCD-200	KPH E.D. 08/24/05
01	ADDED CABINET BASE	SMB E.D. 12/16/04

	NAME	DATE
DR	EMS	12/04
CK	E.D.	12/04
APPD	E.D.	12/04
ECN NO.		
DATE ISSUED	12/10/04	

Quincy Compressor
3501 Wismann Lane
Quincy, Illinois 62301

MODEL QPCD-100, 125, 150, & 200 CYCLING REFRIGERATED AIR DRYER

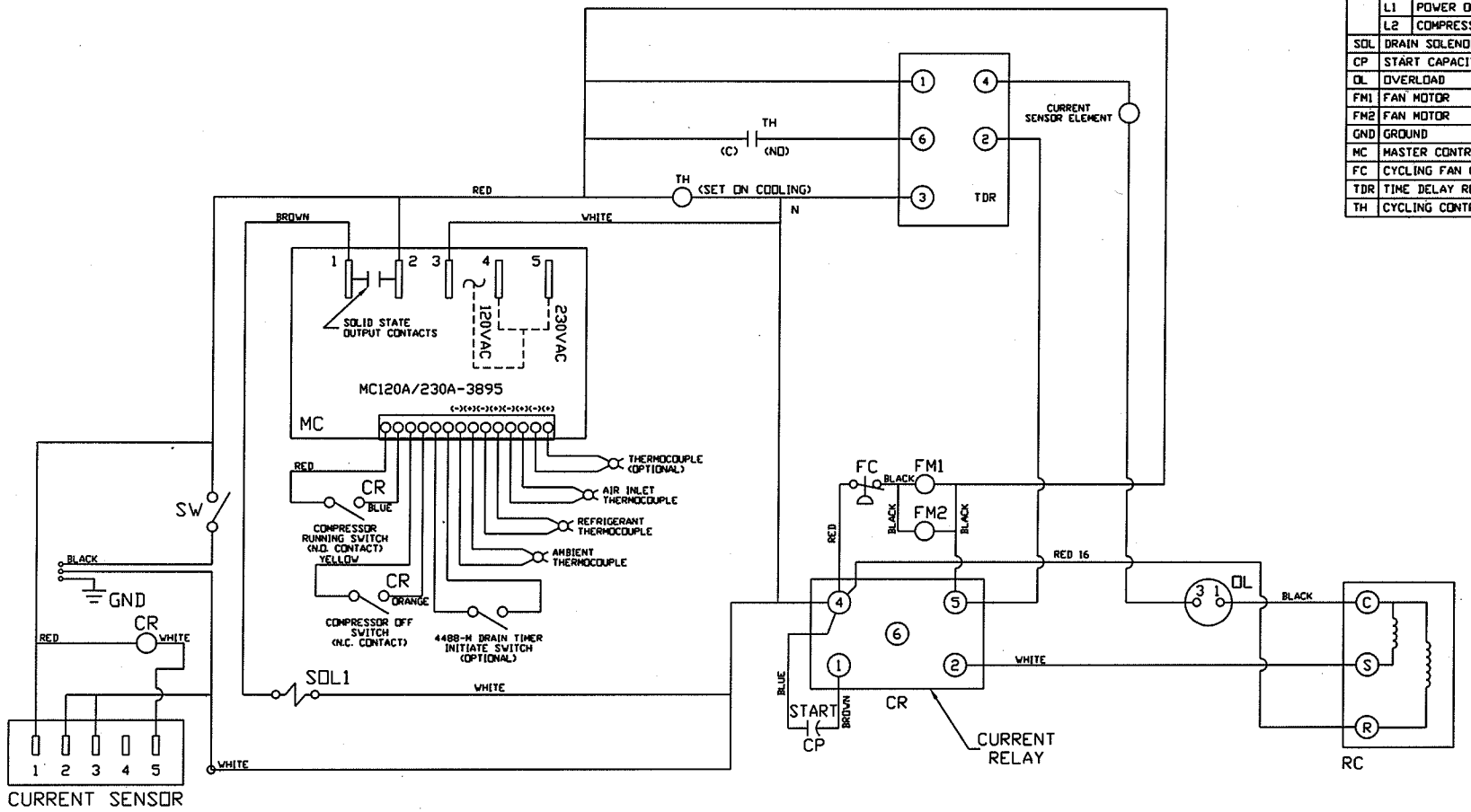
DWG. NO QRF-1060 REV 02

NOTES:
1. CAUTION: ELECTRIC SHOCK HAZARD, DISCONNECT THE REMOTE ELECTRIC POWER SUPPLY OR SUPPLIES BEFORE SERVICING.
2. CONNECT POWER SUPPLY THROUGH A FUSED DISCONNECT SWITCH OR CIRCUIT BREAKER.
3. CAUTION: USE TIME DELAY FUSES.
4. USE COPPER, 60°C. WIRE INSULATION FOR FIELD WIRING.
5. CUSTOMER POWER SUPPLY MUST MATCH DRYER NAMEPLATE VOLTAGE.

POWER SUPPLY	REFRIG-ERANT	REFRIGERATION COMPRESSOR HP	RLA	LRA	FAN MOTOR HP	RLA	MAXIMUM DISCONNECT FUSE	MINIMUM CIRCUIT AMPACITY
115V-1PH-60HZ 100V-1PH-50HZ	R-134a	3/4	13.3	69.0	(2) 16 WATT EA.	1.00 EA.	20 AMP	18.6

NEMA CLASS: 1

CR	CURRENT RELAY	STD.
RC	REFRIGERATION COMPRESSOR	STD.
SW	POWER ON/OFF SWITCH	STD.
L1	POWER ON LIGHT (AMBER)	STD.
L2	COMPRESSOR OFF LIGHT (RED)	STD.
SOL	DRAIN SOLENOID VALVE	STD.
CP	START CAPACITOR	STD.
OL	OVERLOAD	STD.
FM1	FAN MOTOR	STD.
FM2	FAN MOTOR	STD.
GND	GROUND	STD.
MC	MASTER CONTROLLER	STD.
FC	CYCLING FAN CONTROL	STD.
TDR	TIME DELAY RELAY	STD.
TH	CYCLING CONTROLLER	STD.



EMBRACO-ASPERA COMPRESSOR

01	ADDED QPCD-150	KPH	E.D. 08/24/05

	NAME	DATE
DR	SMB	03/05
CK	E.D.	03/05
APPD	E.D.	03/05

ECN NO.

DATE ISSUED 03/03/05

Quincy Compressor
3501 Wismann Lane
Quincy, Illinois 62301

MODEL: QPCD-100, 125, & 150 CYCLING REFRIGERATED AIR DRYER WIRING DIAGRAM (R-134a)

DWG. NO. QRFE-1044 REV 01

www.quincycompressor.com

Quincy COMPRESSOR

The Science of Compressed Air

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Member of CAGI Compressed Air and Gas Institute www.cagi.org

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